December, 1955

THE CHEMIST

VOLUME XXXII NUMBER 12

Dr. Henry B. Hass *(at right)*
Accepts Honor Scroll of New York AIC Chapter from John Kotrady.
Dr. G. Bryant Bachman at center.
(See Page 442)

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Award of the Chicago Chapter Honor Scroll to Dr. Charles C. Price, F.A.I.C.
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Presentation of Pennsylvania Chapter Honor Scroll to Dr. Mary L. Willard, F.A.I.C.
An Outline for Creative Thinking, Dr. Maurice J. Kelley, F.A.I.C.
Professional Careers in Industrial Research, Dr. M. Scalera, F.A.I.C.

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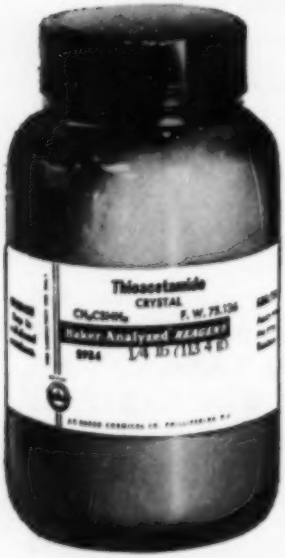

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EDITORIAL

The First and the Last Brick or Credit and Creativity

Dr. Donald B. Keyes, F.A.I.C.

Former president of The American Institute of Chemists

ONCE UPON A time, Pat Hooligan, the city's mayor, had the happy thought of building a beautiful brick wall in front of the city's jail. As he once had been a brick layer, he laid the first brick with appropriate festivities at the taxpayers' expense. While the wall was being erected, Pat, unfortunately, drove his Stutz Bearcat into a tree that apparently wandered into the highway. Joe Lavinsky became the new mayor. Joe, not wishing to perpetuate the name of his predecessor, laid the last brick and the taxpayers were duly impressed by the truly marvellous ceremony.

Today in the scientific world we have suddenly realized we are running short of creators or "First Brick Layers" and seem to have, for the moment at least, a sufficient number of "Last Brick Layers." Someday we may realize that who we need is plenty of "Brick Layers."

When I was a small boy a teacher told me Robert Fulton was the inventor of the steam boat. Many years later it was called to my attention that there had been built and operated twenty-eight steamboats before the "Claremont" puffed up the Hudson, but it was the first steamboat to operate at a profit. Furthermore I was told that Mr. Fulton was such a good business man that he obtained a "patent" from Albany which gave him the exclusive right to operate a steamboat on the Hudson. Thus my hero moved from a "First Bricker" to a "Last Bricker," but how about the thousands of creators who have made possible the modern luxury liner? Who were they? Don't they deserve any credit?

Remember, the modern liner resembles the "Claremont" about as much as the 1956 Mercedes-Benz sport car resembles the Roman chariot, and yet the only name we have today is Robert Fulton.

The moral of this story is: If you want credit for your creations make certain to lay the first or the last brick, but if you just want to create or lay bricks, it is much easier and a lot of fun, and furthermore we must have someone to build the wall.

Elected: Dr. Cecil L. Brown, F.A.I.C., of Esso Research and Engineering Co., Linden, N. J., as honorary treasurer of the American Section, Society of Chemical Industry, for 1955-1956.

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Stimulating Creative Minds

Dr. Henry B. Hass, F.A.I.C.

President, Sugar Research Foundation, Inc.

(Acceptance address when the author received the Honor Scroll of the New York AIC Chapter, June 2, 1955).

AN IDEA IS always the product of the thinking of a single man or woman. It may be that two chemists think of the same thing at about the same time. It is often true that the new idea represents only a small step in advance of prior knowledge. Still, the laborious task of producing something new has to be done by some one person. When the fledgling idea emerges the author is probably the only person in the world who believes it. He is a minority of one!

Now there is a peculiar thing about a new idea; it usually looks ridiculous at first. The history of human progress can be traced by noting what was the butt of humorists at various times. I remember the poem about "Darius Green and His Flying Machine," the cracks about short-haired women, and long-haired men who were foolish enough to believe in women's suffrage, and the have-you-gone-out-of-your mind? expressions on people's faces when I said in 1945 that coal would ultimately be used mostly as a chemical reactant while our energy would come from nuclear chemistry.

Kettering has expressed it this way: "I used to write the report of scientific meetings the day before they were held and if you propose any new things you could always write down this, 'Mr. Jones proposed the new diesel locomotive and after due consideration, it was the consensus of opinion that it was not practical.' That was always the answer and it is always going to be so. Don't get discouraged about it. We present a thing and we know what they will say. They throw it in the wastebasket. You put it back on the table and someday maybe they will say it is quite practical. If you propose anything new, I will give you a written guarantee on exactly what will happen."

It reminds one of what Ruskin said of a truly great work of art. Its first effect on one is a feeling akin to pain.

Now the importance of this is that there is an unknown but probably high mortality rate among good, new ideas. This is a loss which we can ill afford. For every scientific achievement must begin as a new idea. As Hanford has pointed out, progress in science usually results from day-dreaming. The day-dreams are of either the "I wish" or the "I wonder" kind. One leads to applied research, the other to pure research, as nearly as one can differentiate between them.

If we develop a habit of mind

which is intolerant of independent thought, if we are too impatient with the "screw-ball" who doesn't look at things our way, scientific and inventive progress must inevitably suffer. It is no accident that the United States and Switzerland, which have long been the sanctuary for the dissenters of Europe, surpass all other countries in invention.

One of the great mysteries of scientific education in the United States is why the small, denominational, liberal-arts colleges provide such a disproportionately large share of our Ph.D. scientists. Or why a single, numerically insignificant group of Unitarians has given us twenty-two per cent of the people honored in New York University's Hall of Fame. I can't help but believe that fostering the attitude represented by the old hymn:

"Dare to be a Daniel
Dare to stand alone"

may have something to do with it.

Wisdom in research direction thus includes tolerance for the other fellow's ideas which may seem a bit foolish to us. There is a duty corresponding to every privilege and it is the duty of an original thinker to express his ideas clearly so that his associates will understand, so far as possible, exactly what he means. Chemists are continually being criticized for lack of facility in conveying ideas. I think that perhaps the principal trouble here is an unwillingness to make the mental effort to put oneself in the position of the listener or reader. It is necessary to keep asking yourself, "Would this be clear to me if I knew only what my reader knows about these experiments?"

It should be remembered that organic chemists do not do their professional thinking mostly in words. It is rather by a type of symbolic logic something like a picture and something like algebra invented by Kekule and called the structural formula. We have been too much influenced by logicians whose verbal cleverness gives an impression of profundity and who have assured us that all thinking or at least all clear thinking is done with words. Wertheimer[1] quotes Einstein as saying, "I very rarely think in words at all. A thought comes, and I may try to express it in words afterwards." If we remember that organic chemists have to translate into what has become, in a sense, almost a foreign language, we may be more tolerant of their lack of facility in English.

The natural desire for complete freedom in creative activity has been expressed most eloquently by Kipling:

"When Earth's last picture is painted, and the tubes are twisted and dried,
When the oldest colours have faded, and the youngest critic has died,
We shall rest, and, faith, we shall need it—lie down for an aeon or two,
Till the Master of All Good Workmen shall put us to work anew.
And only the Master shall praise us, and only the Master shall blame;

(1) Productive Thinking. Harper, page 24.

> And no one shall work for money, and no one shall work for fame;
> But each for the joy of the working, and each, in his separate star,
> Shall draw the Thing as he sees It for the God of Things as They are!"

Mees has expressed the same basic idea in very different words:

"Research is a gamble; it cannot be conducted according to the rules of efficiency engineering. Research must be lavish of ideas, money and time. The best advice, is don't quit easily, don't trust anyone's judgment but your own, especially don't take any advice from any commercial person or financial expert, and finally, if you really don't know what to do, match for it. The best person to decide what research work shall be done is the man who is doing the research. The next best is the head of the department. After that you leave the field of best persons and meet increasingly worse groups. The first of these is the research director, who is probably wrong more than half the time. Then comes a committee, which is wrong most of the time. Finally there is the committee of company vice presidents, which is wrong all of the time."

After writing the above passage, Mees took enough time out of his busy life to write a whole book on research direction. The point is that group effort is impossible without some kind of organization, and the complexity of present problems necessitates group effort if progress is to be made rapidly and efficiently. As soon as you have a group working together, unlimited freedom for the individual becomes as impossible as unlimited freedom in driving a car on a busy road. So we have direction by research committees, it is generally successful, and it looks as if it is here to stay.

One of the reasons for this is the tendency of some scientists to ignore economic considerations. Recently a chemist for one of our greatest companies produced with much enthusiasm a new process whose material cost exceeded the selling price of the product. This was not caught until the chemical engineers had it in pilot plant. A very few such examples justify a considerable amount of research direction.

It is fashionable to say that economic thinking with respect to scientific research is proper in the industrial laboratory but not in the university. This philosophy produces young scientists who find it necessary to reorientate their whole basis for problem selection after graduation.

If the university had maintained its original status as an adjunct to the priesthood and the monastery this attitude might be appropriate. But since the Morrell act was passed in 1863 and state universities were set up for the express purpose of being of assistance to "agriculture and the mechanic arts" the universities have come more to grips with reality with each passing decade. Here in the conservative East where the ivy grows

most luxuriantly on ancient halls of learning, we are still wondering how or whether a university can function under such conditions. Way back in the nineteenth century, a Purdue professor discovered the desirability of putting drive-wheels and shafts on steam locomotives into dynamic rather than static balance. This diminished the tendency of the iron horse to pound the rails and roadbed. It was hard for the rest of us Purdue professors to discover that the School of Mechanical Engineering had been in any way harmed by this occurrence. On the contrary, by every standard of measurement, the school was aided and advanced.

Basically the university is a sociological institution whose support by the public must rest upon its contributions to public welfare. These are many and varied and range over the whole area of human activities, but I can see no advantage and many disadvantages in failing to recognize that ivory towers are only figments of wishful thinking. The pride and glory of the university rests to a large extent in such things as penicillin, streptomycin, and the development of atomic energy, which have flowed out to enrich the life of our time.

False snobbishness regarding the practical has, so far as I can see, no place in the realistic struggle in which the world now finds itself engaged.

A further requirement of creative thinking is a profound and enduring dissatisfaction with things as they are. When I was a boy it was considered a virtue to be contented with the life to which one was born. This attitude is undoubtedly conducive to happiness in a static society, but it is not what created the greatness of America. Our ancestors were the people who were dissatisfied enough to escape from the wars and tyrannies of Europe and to come to the New World to make a fresh start. They objected to existing forms of government, so they created a new one. They were unwilling to continue with the inconvenience and drudgery of the life they knew, so they became the most inventive nation in the world's history.

Now we have an educational psychology that has for its goal the happy adjustment of the individual to his environment. It looks to me much like the modern version of "The Contented Boy" of the McGuffey Readers, the youth who had so little imagination that he could not think of anything which he wanted that he did not have. If by adjustment we mean being content with what is mediocre or worse, we had better forget it.

Before anything can be invented it is necessary to want something which does not exist. This is true of the whole creative process, whether it is a poem, a musical composition, a painting, or a scientific advance. If the psychologists ever are able to make everyone well enough adjusted to present reality, that will mean the end of progress. Americans being

what we are, I think this unlikely.

It was formerly believed that the scientist who is seeking to discover truth is doing something essentially different from the musician, artist, or inventor who produces something new. This view has gradually become obsolete since the publication of Karl Pearson's *Grammar of Science*. Pearson points out that Newton's law of gravitational attraction, for example, is only an intellectual invention by Newton which fitted the observed facts better than the previous concept. When it did not give correct predictions for the motion of the planet Mercury it was superseded by the concept of relativity. Even Pearson fell into the semantic trap of speaking of "discovering" a natural law. The modern concept is that a natural law is a human invention as much as a self-starter. It does not happen to be patentable but it results from the same creative processes.

Creativity is so important that the process has been analyzed into various numbers of steps. Eliot Hutchinson,[2] a thoroughly trained psychologist who has studied creative thinking, has analysed it into four main steps which do not necessarily happen entirely in logical sequence. These are preparation, frustration, insight, and verification. To these I would prefix, formulation of the problem, which is often of consummate importance.

In tackling a new scientific problem it is unfortunately necessary to acquire the basic knowledge of what has been done in the field up to the present. Progress in science is a growth; each forward step is made possible by what has gone before. It has become fashionable in certain intellectual circles to decry "mere memorizing" but the fact is that every prolific inventor which I have ever known has been a man like Carleton Ellis or Gustav Egloff with phenomenal memories and a lifetime of devotion to stocking them with important facts. It should be noted that their motivation for learning and retaining facts was very strong because experience had demonstrated their usefulness. . .

We have all known men who knew many facts but who were not creative. Facts are necessary but not sufficient. An invention is essentially a new arrangement of facts. It occurs only if a person has formed the mental habit of questioning commonly accepted beliefs and ways of doing things. For thousands of years cities had been built horizontally; New York showed that a city could be expanded vertically. The new element which made this practical was cheap structural steel. The sewing machine could not be invented until the thread was put in the point of the needle instead of at the back.

When a creative scientist struggles with a problem and sees no solution, frustration is inevitable. This is what makes us hard to live with sometimes. It is often desirable to push the prob-

(2) How to Think Creatively, Abingdon Cokesburg.

lem back into the subconscious where our memory is better. The vast majority of creative people have had the experience of going to sleep with a problem in mind and waking up with the solution.

We have hardly begun to grasp the capabilities of the subconscious mind. In the brief second of falling out of bed a dream will occur which may require five minutes to tell. The importance of this is that it proves that not even the most creative person has even come close to realizing his potential rate of productivity.

The flash of insight when a possible solution to a difficult problem occurs is one of the most satisfying of all human experiences. Thought is so rapid that many people have the feeling of being simply an amanuensis for another personality. There is a tremendous conviction of certainty that the right answer has been found.

At this point our scientific training should assert itself. If we are realistic we write the idea into a book and let it "cool off." The next day many of these ideas look a little foolish.

It is of the utmost importance to realize that there is a fundamental incompatability between the mood of creation (or insight) and the mood of criticism. Any good scientist can and must function in both capacities but *not most efficiently at the same time.*

A device which is coming into use is the conference where a problem is proposed and unconventional thinking about it is encouraged. Criticism for the time being is completely forbidden. Even a foolish idea may stimulate a better one in some other member of the group. If we try to combine creation and criticism many good ideas will never come to light.

If you have not tried the technique you will be surprised at how many people can be creative when encouraged to be. Weren't we all surprised at how valuable the suggestion systems were in our industries when we installed them?

After we have recorded all of the ideas, good, bad, and indifferent, we are in a position, perhaps the next day, to evaluate them and select the one or the few which deserve application. At this stage we must be ruthless in discarding the mediocre or even the very good if there is a still better one. Often the best idea is a synthesis of some of those suggested.

The question may properly be raised as to how you know which is the best. Of course you can't know; all that is possible is to use one's best judgment. But there are three general criteria of value.

(1) One should reject the complex in favor of the simple. In philosophy this is known as the principle of Occam's razor and can be stated in the words: "An hypothesis should never be more complicated than the experimental facts require." Its validity can be proved by simple arithmetic: there are an almost infinite number of ways in which you can imagine something, not more than one

of these corresponds to reality. Therefore an hypothesis not supported by fact is almost certainly incorrect. Most of the nonsense which people believe could be demolished by a wider appreciation of this axiom.

It is much harder to reject the complex than first appears. This also goes back to arithmetic. If you had a game like baseball with only two batters there would be two possible batting orders, AB and BA. In actual baseball there are factorial 9 possible batting orders, or 362,880! The complex ways of doing anything are so much more numerous than the simplest way that it requires great persistence and often ingenuity to seek out the simplest. But very often the simplest way is the most economical and the best. When the best way is not the simplest it is likely to be one of the simplest.

Kettering had a motto on his office wall reading, "This problem too will look simple after it is solved." Einstein used this principle in developing the theory of relativity. A blind alley showed itself such by leading to endless complications. Avoiding these he came at last to the magnificent simplification $E = mc^2$.

(2) The second general rule is to try the best thing first, because if it is successful you never have to bother with all the others. In synthetic, industrial, organic chemistry the best way is frequently the one with the lowest material cost. This seems like belaboring the obvious, but at General Aniline we made 10,000 surfactants from ethylene oxide and various lipophilic substances with OH, SH, NH, or ester groups. If we had remembered that sucrose is a cheaper source of hydrophilic groups than ethylene oxide much or all of this work might have been avoided.

(3) The third principle of wide applicability in research and indeed in many other life situations is to recognize unjustified biases in our thinking and to do the opposite of what the bias suggests. Have you ever noticed that the best vacant seats in a public auditorium are usually on the left? This is simply because we are in the habit of going to the right. In traffic this habit has great survival value; in choosing a seat it is of negative value. Knowing when to conform and when to be original is a subject worth a whole evening in itself.

The reason why I am so interested in sucrochemistry is that in the thirty centuries during which mankind has had pure sugar available we have made less than a dozen pure derivatives. We have had benzene for less than 130 years and already there are something like 100,000 pure benzene derivatives. I am sure that many more valuable benzene derivatives will be discovered but, compared to sucrose, research on benzene derivatives ran into the law of diminishing returns long ago. It isn't true that sucrose derivatives are hard to make. The only difficulty is a mental one; we conform rather than doing some-

thing original.

It has long been the custom of chemists to feel superior to psychologists because our science is more exact than theirs and hence more predictable. This is a foolish kind of mental provincialism which we should do well to forego. The work now being done on creativity deserves the earnest study of research directors and others in management.

I do not mean that we can all suddenly become creative by reading a book. It is hardly an exaggeration to say that being creative is a way of life. It is, in a sense, opposed to the judicial way of looking at things. A clever patent attorney took advantage of this in a suit in which, with consent of the court, he presented the prior art and asked the judge to make the invention. The judge, of course, could not do so and hence had to rule that invention was present.

We can appreciate that creativity is much less rare than has been imagined, that there are conditions conducive to creativity, and those which stifle it. There is a definite pattern to creative thinking in science and the conscious use of this technique will improve our performance.

Osborn[3] has listed a large number of general approaches such as making it larger, or smaller, or changing the shape, doing just the opposite of the conventional, adapting, modifying, substituting, adding, subtracting, multiplying, dividing, rearranging and combining. "All this is obvious," is the inevitable reaction of intelligent people, but nothing is easier than to overlook the obvious. We had separate rubber erasers and graphite pencils for many decades before someone thought of putting the eraser on the pencil.

Up to now creativity has been taught by what is essentially the apprentice system. A man of ability such as Edison, surrounded himself with younger men who learned by observation and working with the master. So men were developed like Acheson, who gave us carborundum and synthetic graphite.

I am not suggesting that this system is likely to be superseded. Rather, it seems to me that as any subject becomes systematic, organized and, to that extent scientific, it becomes easier to learn and use. This seems to be happening in some degree to the fascinating art of scientific discovery.

My hat's off to the psychologists! I am glad that they are finally giving us some help in learning how to be more like men and less like sheep.

The history of invention shows clearly that most of the best creative thinking is done by men too young to have reached positions of large managerial responsibility. It is of consummate importance that we in management learn how to encourage, stimulate and develop these young men and women. This is what makes the difference between stagnation and progress.

(3) Applied Imagination. Scribners.

Introduction of Dr. Hass

Dr. G. Bryant Bachman

Professor of Chemistry, Purdue University, Lafayette, Indiana

(Presented when Dr. Hass received the Honor Scroll of the New York Chapter, June 2, 1955, in New York, N. Y.)

ONE REASON WHY it is interesting to introduce Henry Bohm Hass is because he has become a more or less legendary figure wherever he has lived. Whether the legend has concerned his youthful appearance, his smooth working mental equipment, his scientific brilliance, or one of his hobbies, it has always been a colorful legend with certain unique features typically Hassian in character . . .

He received the B.A. from Ohio Wesleyan in 1921 and M.A. and Ph.D. degrees from The Ohio State University in 1923 and 1925 respectively. Since then, these institutions have more than doubled in size, although there is no proof that other factors were not involved in this growth besides Henry's attendance.

By the time of his graduate work, Henry had come to recognize the importance of objective rather than subjective approaches to scientific experiments. He therefore confined his continuing studies of carbohydrates to reactions in test tubes rather than in his own stomach and completed an excellent thesis under the late Prof. William Lloyd Evans on the action of potassium hydroxide on dl-glyceraldehyde.

From school, Henry went to work in industry—the Baltimore Gas Engineering Corporation of West Virginia. It was here that he become impressed with the great abundance of natural gas and its tremendous potential as a starting point for the synthesis of organic compounds. His later researches on the chlorination and nitration of hydrocarbons were stimulated by this contact with the natural gas industry.

In 1928, Henry went to Purdue University as an assistant professor. His rise was rapid and within eleven years he became head of the department. Not content with the strenuous requirements of his own research program he found time to stimulate other members of the Purdue staff to greater efforts in their programs. In many cases Henry conceived of important lines of work, secured funds to support them, and then turned them over to his colleagues to develop.

In his contacts with his staff, Henry was exacting but always fair and reasonable. When major but unintentional infractions of the rules occurred he could be counted on for leniency, but for minor and careless infractions Henry believed in making the punishment fit the crime. Thus

the professor who handed in his qualifying examination questions late would be called upon to proctor the examination, and the graduate teaching assistant who returned to school late in the fall would be assigned the task of painting the laboratory ironware and scrubbing the desk tops . . .

I could dwell at length on the 110 journal articles and the 67 patents which Henry published during his twenty-one years at Purdue. I could glow ecstatically about his Modern Pioneer award, his Priestley and Foster lectureships, his honorary doctor's degree and other distinctions, but it would be better to talk about his human side — about the qualities which have led to the Hassian legends.

One of the legends has to do with Henry's infallibility. Most who have known him for long have come to regard him as so infallible that we seldom question his statements or plans when we are with him. However, nothing is perfect, as Henry himself will be the first to admit; and the following incident, told to me by a Purdue professor, illustrates one of Henry's occasional mistakes.

Among Henry's hobbies are singing, mountain climbing and wood chopping. This story has to do with the last of these. One fine summer day, the director of athletics at Purdue, Guy Mackey, decided that it would be desirable to remove a large tree standing beside the fence at one end of the tennis courts. Since he lived almost across the street from Henry, who was well-known for his tree-felling interests, Guy consulted him. As expected, Henry himself volunteered to fell the tree and guaranteed to lay it dead on a line drawn parallel to the fence and well outside the court. Operations proceeded rapidly as planned, and soon the tree was ready to fall. "Timber, Guy, timber," called Henry. "The fence, Henry, the fence," wailed the director; and it is rumored that Henry offered to pay for the damage.

Another anecdote has to do with Henry's youthful appearance. One day, shortly after being named head of the chemistry department, he was striding across the Purdue campus in his usual vigorous manner and fell into conversation with a freshman student.

"And what courses are you taking?" said the friendly undergraduate.

"Well, I'm not taking any courses," said Henry. "You see I'm head of the Chemistry Department."

"Oh, yeah," said the student, "and I'm Dean of Men. But sure 'nough, what courses are you taking?"

Henry was famous for his mnemonics or memory aids and especially for those dealing with the first three laws of thermodynamics. Those of you who carry these laws around in your heads will recognize the appropriateness of the following:

First law—You can't win.

Second law—You can't even break even.

Third law—The hotter you get the more confused you become.

If one speaks of Henry's law every chemist will know that one refers to pressure-solubility relationships of gases. But at Purdue we refer to Henry's laws and by this we mean such perversions as those mentioned and also the one derived from Markovnikoff's rule regarding the addition of hydrogen halides to olefins.

"To him who hath it shall be given," is Henry's succinct version.

Henry created many chemists in his academic career, but I am sure that one of these is of greater pride to him than any of the others. I refer to his son Bob who is now a chemical engineer in the Union Oil Co. of California. Another is his son-in-law, Dr. Donald Hudgin, a chemist with the Celanese Corporation in New Jersey. Of less direct contact with chemistry is his son Tom, now a doctor of medicine. His third son, Dick, is the exception that proves the rule and is not a scientist. These four children have so far produced nine grandchildren and it remains to be seen how many of these become chemists.

It would be a gross omission not to mention Henry's wife, Georgia, who, while not actually a chemist, must be classed as an alchemist of the highest talent, because she has played so important a role in helping to create the chemical gold of the Hass family. Merely living with a genius is, I suspect, a task requiring magical powers, and these Georgia has in abundance.

We miss Henry at Purdue in more ways than one. Six years ago, in 1949, he came to the New York area, first as manager of research at General Aniline, and now as president of the Sugar Research Foundation. No doubt his activities here are influencing his environment even as they did in Lafayette. Certainly, even a casual visitor can notice that life here is sweeter than it was before Henry came. If he continues at his present pace, I shall expect to see the streets and even the buildings built of sugar or some derivative of it. Incidentally, Henry will soon relax his reticence in discussing freely the new edible detergents formed from sugars and fats which he has developed.

I have saved for last, reference to one of his outstanding characteristics —his love of limericks. Since I could not find any from his collection which seemed suitable, I have taken the liberty of writing some myself. The meter of limericks is somewhat foreign to my nature, so I had to spend a good deal of time composing them, and I apologize for any lines which you may find not to scan. However I can think of no greater service to render my good friend, Henry Hass, than to provide him with limericks which can be quoted in mixed company.

The Story of Henry B. Hass

Our hero was born in Ohio
At science he first was a tyro,
But he went to a college
And improved on his knowledge,
Till his brain spun as smooth as a gyro.

He figured out life with pure logic,
Which helped in all things pedagogic,
But one day at eighteen
He met Georgia—the queen,
And his thoughts turned to things biologic.

In research he stressed processes gaseous
And fought all ideas fallacious
He studied nitrations
In all variations
And published some graphs quite
curvaceous.

He tackled war work at capacity
Much dismayed by our foes' crude
rapacity.
On charcoal and chlorine,
Explosives and fluorine,
He labored with skill and audacity.

One day this professor called "Henery,"
Who existed in relative penury,
Opined, "This is fine
But a far better time
Would result if I gave up my tenury."

"So I'll hie me to old New York City
And I'll think of some slogans so witty,
That sucrose will sell
And some fructose as well,
And permit me to sweeten my kitty."

Yet Henry in spite of his pace
Found time to add kids to the race.
His life is a whirl
With three boys and a girl.
And grandchildren every place.

When life becomes boring and grim,
Henry turns to his hobbies with vim.
Over mountains he hops
And through wood piles he chops,
Then he tops it all off with a swim.

He also is gifted at singing
His voice has a timbre most ringing
He chants with a zest
But at hymns he is best
The result of a churchly upbringing.

Now my story of Hass is near ended,
His merits proclaimed and defended,
This tale of his life
Can be checked with his wife,
Who has shared it as Henry intended.

Presentation to Dr. Hass

THE NEW YORK CHAPTER OF THE AMERICAN INSTITUTE OF CHEMISTS presented its Honor Scroll to Dr. Henry B. Hass, F.A.I.C., president of Sugar Research Foundation, Inc., New York, N. Y., at a dinner meeting at the Hotel Commodore, New York, N. Y., June 2, 1955, preceded by a reception sponsored by the Sugar Research Foundation.

Honorary Chairman of the meeting was Dr. Raymond E. Kirk, of Polytechnic Institute of Brooklyn. Dr. Hass was introduced by Dr. G. Bryant Bachman, professor of chemistry, Purdue University. The Honor Scroll was presented to Dr. Hass by John Kotrady, retiring chairman of the Chapter. Dr. Hass spoke on "Stimulating the Creative Mind." (See preceding pages.)

Before he became president of Sugar Research Foundation, Inc., in 1952, Dr. Hass was manager of research and development at General Aniline & Film Corporation for three years. Earlier, he was a member of

the faculty of Purdue University for more than twenty years, serving as head of the Chemistry Department from 1937 to 1949. From 1942 to 1946, he was also associated with the Manhattan Project in the development of fluorocarbons. Among his outstanding accomplishments at Purdue, was the development of vapor-phase nitration processes which are expanding into large-scale operation at Commercial Solvents Corporation, Peoria, Illinois. As a result of the discovery, more than seven-hundred organic compounds have been produced and further processes have been based upon the nitroparaffins.

Dr. Hass is currently assisting in the advancement of sucrochemistry, the science which uses sugar and its by-products as the basic starting material in the production of industrial and consumer products.

The citation to Dr. Hass reads:

Teacher and example to a generation of students, warm-hearted friend, scholar and philosopher, creator in a chemistry of petroleum, and now blazing imaginative trails into unexplored realms of sucrochemistry.

Appointed: Dr. Harold M. Sonnichsen, F.A.I.C., as vice president of Permacel Tape Corporation, New Brunswick, N. J. He is director of the technical division and a member of the board of directors of the corporation, which he joined in 1944.

AIC Gold Medal Award

The 1956 Gold Medal of The American Institute of Chemists will be presented to Raymond Stevens, F.A.I.C., vice president of Arthur D. Little, Inc., Cambridge, Mass., at the AIC Annual Meeting to be held May 9-11, 1956, in Boston, Mass.

The award is made in recognition of Mr. Stevens' "Contributions to the wider understanding of essential procedures for the management and operation of industrial research."

His promotion of industrial research includes guidance in such new areas as operations research, flavor and odor research, and the development of latent patents. The orientation of research activities, the human side of management, and the age factor in research, are important phases of the subject to which he has devoted attention. In World War II, he served as chairman of the Committee on War Use of Research Facilities. He is editor of Vol. II of *Research — A National Resource,* published by the National Research Council.

Appointed: Paul H. Lobik as advertising manager of Precision Scientific Co., Chicago, Ill.

Honorary AIC Membership For Dr. McClure

DR. HARRY B. MCCLURE, F.A.I.C., president of Carbide and Carbon Chemicals Company, division of Union Carbide & Carbon Corp., will receive honorary membership in THE AMERICAN INSTITUTE OF CHEMISTS at a dinner meeting, January 12, 1956, at the Hotel Commodore, New York, N. Y. Dr. McClure will address the group on "Benefitting from Research Results."

Dr. McClure's theme will be that research discoveries may not benefit mankind unless someone devotes time and energy to develop the discovery. Thousands of chemicals are being synthesized each year. Many of these discoveries may not realize their full promise unless research is carried out and the results become available to the public.

Toastmaster for the occasion will be Dr. Sidney D. Kirkpatrick, vice president, McGraw-Hill Publishing Co., Inc. A review of Dr. McClure's career will be provided by Lawrence H. Flett, consultant to National Aniline. Dr. Ray P. Dinsmore, AIC president, will present the honorary membership.

Richard L. Moore, chairman of the New York AIC Chapter, announces that a reception will be held at 6 p.m., sponsored by Carbide and Carbon Chemicals Company. Dinner will follow at 7 p.m. Dress is optional. Reservations may be made through Shepherd Stigman, Foster D. Snell, Inc., 29 W. 15th St., New York 11, N. Y. (WA 4-8800).

Almost all of Dr. McClure's professional career has been spent with Carbide and Carbon Chemicals Co. His first position was as research fellow at Mellon Institute. During the past twenty years, he has been successively, manager of the Fine Chemicals Division of Carbide & Carbon Chemicals Co., vice president, and executive vice president of the company. He was appointed president in 1954. He has long been concerned with the development of new chemicals and new uses for them. He was honored in 1950 by the Commercial Chemical Development Association for valuable service to the chemical industry.

Reduced: For the second time, the price of sebacic acid by Harchem Division of Wallace & Tiernan Inc., 25 Main St., Belleville 9, N. J. (See page 430).

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Management Looks at the Chemist

Dr. Foster Dee Snell, F.A.I.C.

President, Foster D. Snell, Inc., 29 West 15th St., New York 11, N. Y.

(This paper was originally prepared for presentation at the 29th Annual Meeting of THE AMERICAN INSTITUTE OF CHEMISTS. It was revised October 11, 1955, by the author for publication.)

PROBABLY AN APPROPRIATE start is to state my qualifications to discuss the subject. It is that my experience has ranged all the way from teaching and a laboratory job to managing a research organization which, while small by the standard of many industries, is large in terms of independent consulting organizations.

I selected the topic because I knew that many attending this meeting would be young chemists to whom the words "management" and "executive" sound like something remote and abstract. Before I finish I hope to have shown you that ninety-nine per cent of you are managers or executives at least part of your time.

Management—that's a good word! To the laboratory man, management means his group leader; to the group leader in turn it means his assistant research director, to the assistant research director it means those who control the budgets, and so on.

Management has the privilege of giving instructions—often called orders but preferably phrased as suggestions. The responsibility is to see that the instructions or suggestions are clearly enough worded so that they will not be misunderstood and that the person to whom they are given is capable of carrying them out. Don't tell a physical chemist to develop a synthesis of isonicotinic acid!

Management has the doubtful privilege of deciding how, where, and when work is to be done but the responsibility of seeing that the how is feasible, the where is physically adequate and the when attainable. In short, the responsibility for getting results ultimately devolves on management and no "General blamed the Colonel, Colonel blamed the Captain," etc., will serve.

It is a privilege of management, usually through a personnel officer, to select what workers will be used and a responsibility to engender such inspiration and loyalty in those workers as will produce results.

Management has the privilege of setting up the systems of internal and external coordination and then woe to management if it does not lean over backward in assuming the responsibility of scrupulous conformity to such systems.

Another privilege of management is that of leadership which carries the responsibility of setting a good example in every way and in par-

ticular of conferring with such assistants at such intervals as are necessary to provide that leadership.

Finally, management has the privilege of determining policy, particularly with respect to personnel relations and then is definitely responsible for seeing that policy is followed and personnel kept happy.

There is a point where I could stop by simply defining management as the responsible people at the head of an organization, usually several people rather than one, and all the people down the line to whom the responsibilities are delegated. The responsibilities of management outweigh the privileges but are somewhat counterbalanced by greater compensation accompanying greater responsibility. Some men try to take the privileges delegated to them and try to have someone else take the responsibility, notably by checking every point with the person to whom they report. Such people do not last long.

Rather let us see how one does research. We all do it basically the same way. We get together what we think are a number of competent group leaders. We assign them what we believe are adequate personnel. We define the objectives to be attained, we cooperate on the plans for carrying out assignments, and we give guidance as the work progresses. It is then the duty and responsibility of the group leaders to do or have done the day-to-day job of preparing set-ups (I mean of equipment rather than the liquid variety), conducting the laboratory work, making observations, entering records, writing progress reports, and drawing conclusions. They, the group leaders, must cooperate, collaborate, and coordinate. Sometimes they do.

Management would like to select competent people and then give them their problems and their budgets and sit back and have things roll along. That's idealistic. But it's unrealistic. Results have to be evaluated to see whether each group is getting anywhere on their problem or problems. Guidance has to be given them. It has to be given in such a way that the guidee feels that it is only guidance, not instructions. Nothing kills initiative quicker than instructions of exactly what to do and how to do it. Chemists have to be listened to sympathetically and encouraged when the going is rough. Over-enthusiasm when things go well must also be minimized so that the swings from enthusiasm to discouragement will be lessened.

Any research organization, consulting or otherwise, is neither better nor worse than the sum of the knowledge, experience, and capabilities of its total personnel.

As a matter of management the research group is the basic unit. Possibly in consulting, we give more authority at the group-leader level than does the average executive in industry. I use group leader as a descriptive term; there are varied titles used within different industrial organizations for

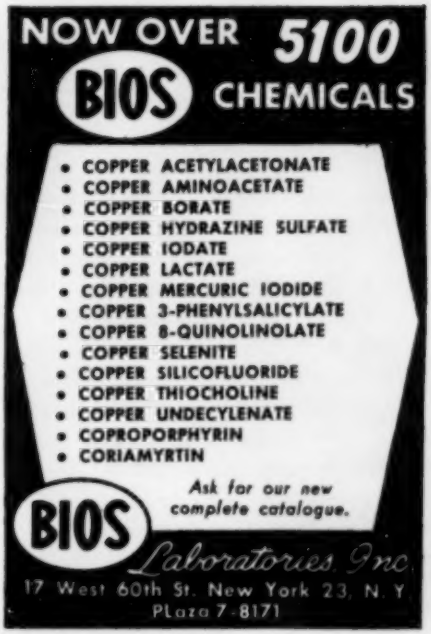
the person at that level of responsibility. Actually this is a person who has from one to ten chemists working under him. These chemists are assigned laboratory space and do the actual operations. They may or may not be closely supervised by the group leader; may need to consult him several times a day. The degree of supervision naturally correlates with the particular work assignment and with the degree of experience of the laboratory chemist.

Theoretically, the exact hours kept are not of first importance; practically it's bad policy to make exceptions, as it creates hard feeling among those who may feel less privileged than anyone not keeping the usual time schedule.

The responsibility of management for the acts of its assistants is absolute. Responsibility is a moral attribute. One responsibility not previously mentioned is to see that some group does not just consume its budgets without real production.

In the consulting organization this has three phases. First is the moral duty to the client who stands in the same relation as any employer. The second is the business aspect; if results are not produced the consulting organization gets fired just as a laboratory employee of a corporation does. The third aspect is a matter of personnel relations, other groups would get the idea that they need not really work either.

But all that is somewhat superficial.



What is important is the selection of competent men. No supervision or guidance or anything else will make up for a poor selection at the start. The ideal research man is his own boss. He finds it harder to please himself in terms of results than to please management. He wants to get the facts, and to know what his results show; in other words, he becomes interested in the problems for their own sake. Therein lies the answer to creating scientists, whether they work at a lab bench, or do desk work.

In the hot-spot position of determining when to advance and when to withhold responsibility, management, being human, makes mistakes. But personnel does too. People, while still

too green to be put in responsible charge of projects, may think they are ready and press the employer for premature advancement in responsibility. If the employer does not agree, they go elsewhere to get that education which teaches them that they really weren't ready for responsibility. There's a laboratory education that has to follow college—how true—learning new technics and how to deal with the complex commercial products that come into an industrial laboratory. Management must pick the time within a reasonable period when a man has progressed to the stage where he can take responsibility. If not advanced in rank he goes where he can get the responsibility.

But what is worse, from every standpoint, is to give a man responsibility before he is ready. He flounders, gets discouraged, justifiably because it is management's fault, and will not go back to the old job which he was competent to carry on.

Not all men advance at the same rate—a truism. The most valuable men are not necessarily those which advance most rapidly. Steady progress is better than the brilliant advance which can't keep up. A few years as a member of a group, a year or two as a straw-boss to break in on managing at the group leader level, and probably you have a good man—you hope. To look at it from a different angle, the "genius" is often a problem child.

What criteria should a man set for himself? Compensation is not the deciding factor in a majority of cases. I will illustrate with an extreme example. A man wants a job which has intellectual as well as manual aspects. I do not know a real research chemist, however young, who would accept $10,000 a year to work on an automobile assembly line. See what I mean? If there is not intellectual satisfaction as well as financial compensation your true researcher will quit. If he will not he's not the man you want. He is not and never will be a scientist.

If he isn't more interested in results than in the compensation, although that must be adequate and must conform to the going rate, he should leave the laboratory and become a salesman. That's where the money is. In science mere dollars are not a measure of success.

Again expressing the ideal, a man should segregate his personal life from his research—to a reasonable extent. That doesn't mean that he shouldn't ever discuss his work at home or his home at work. It does mean that his wife's, children's, or girl friend's tantrums or illnesses or perversities should interfere with his work to no more than a reasonable amount. If you've had a secretary fall in love or get religion you know just what I mean. Of course, if his wife married him under the impression that within six months he was going to discover a new way of splitting the atom, then you got yourself a load of trouble

without knowing it. In interviewing, one doesn't ask what a man's wife expects of his job but it can be a factor.

There is one type of chemist we can do without. We describe it as the flash-in-the-pan type. He accomplishes one result of greater or lesser significance. His company adopts it; if a product, usually a minor one. Then the inventor expects to repose quietly on his *derriere* for the rest of his useless life. The chemist you and we want finishes up one accomplishment and goes on to the next. We all want more Tom Midgleys.

We have to live with our fellow man. Your chemists too must be capable of doing so. Therefore, the chemists all of us are looking for are pleasant, tolerant of their fellow man. When I say that a chemist must be tolerant, I speak of others' opinions, not of the legal triumvirate, race, creed, or color, although that kind of tolerance is also desirable. More specifically, a man may have an opinion as to a product, process, or reaction. But if he tries to defend that opinion instead of being open to another opinion, subject to experimental proof, he may find himself defending an obsolete position while others go on. Perhaps it is best expressed that he must have a belief in the intellect and intelligence of others as well as in his own.

In technical thinking, a good worker must be logical. He is preferably but not necessarily logical in other thinking. This leads inevitably to his not being willing to accept anything fully until he can examine it by logical processes of reasoning and prove it experimentally.

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Imagination is necessary. A worker must recognize a desirable result when he sees it, even if it is not what he started out to get. I do not mean that an unsuccessful pancake flour can be expected to be a good adhesive, but an attempt to produce milled toilet soap in a rubber mill gave the U.S. our most widely used process for making floating soap, while milled soap is still made the same old way with minor variations.

Men of diverse abilities are necessary in a group organization. One

might almost say, realistically, some without much ability. Not everyone can be a research director or group leader. And while it is true that it it is harder to fill the few jobs at the top than the many lower down, it is also true that not every soldier should "carry a marshal's baton in his knapsack." Pick and shovel men are needed as well as surveyors and foremen.

As to preparation, education in chemistry goes without saying. Probably the greatest asset after that a man can have is that rare ability to write English. The subject is not a new one. But a formal education is not enough. A man must continue to learn throughout his professional career. Just recall that a man who stopped learning in 1940 would today know really nothing about antibiotics, atomic fission, or benzene from petroleum. All of you have a curiosity about what will be new in 1960. We don't know what it will be but we know it *will* be. You want that type of chemist.

Where does one get those chemists? We try not to concentrate on one or two universities. Get men from various sources, get the training of varied professors and disciplines. And do not overlook the small colleges. Some very good men come from colleges we rarely hear of.

So to summarize the desirable chemist for you and for the consultant:

(1) He has a real personality but not an overpowering one.

(2) He is capable of getting along with his fellow man.

(3) He leaves most of his personal troubles at home when he comes to work.

(4) He is interested in the results of his work with compensation a secondary factor.

(5) He has no more than a reasonable number of eccentricities.

(6) He is creative but tolerant of others as also having capabilities.

Honored: Dr. Ray P. Dinsmore, F.A.I.C., vice president in charge of research and development, Goodyear Tire & Rubber Company, and president of THE AMERICAN INSTITUTE OF CHEMISTS, who received the 1955 Charles Goodyear Medal, at a meeting of the Division of Rubber Chemistry of the American Chemical Society, in Philadelphia, November third.

Dr. Arthur W. Carpenter, F.A.I.C., of the B. F. Goodrich Company, a schoolmate of Dr. Dinsmore, spoke on "Dinsmore — the Man and His Work."

In more than forty years with the Goodyear Company, Dr. Dinsmore has conducted research and directed investigations in the design and compounding of tires and in the development of flexible and film-forming plastics. Specific projects which flourished under his guidance include rayon tire cord, Pliofilm, and the recent Chemigum SL, a special synthetic rubber.

Stimulating Creativity in Research

Dr. Emil Ott, F.A.I.C.

Vice President, Chemical Divisions, Food Machinery & Chemical Corp.,
161 *E. 42nd St., New York* 17, *N. Y.*

(Excerpts from an article by this title which appeared in *Chemical & Engineering News,* Vol. 33, No. 22).

Creativity Can Be Practiced in Teams

HOW CAN CREATIVE work which is strictly individual be practiced in a group? Sometimes an imaginative individual, usually highly creative himself, may see the value and significance of the creative work of others and help sell it.

Exposure or contact with creative work of others is one of the biggest stimuli to creativity in an individual. Creativity in one field may stimulate in another field. Many scientists receive stimulation in science through the practice of some form of art. Highly creative researchers and teachers have created schools of creators! When working in the same field these schools are really teams.

This team phenomenon has all kinds of variations and degrees, just as creative thinking varies tremendously . . . Creativity is the very root of civilization and at the same time is its finest product.

Tendency to Conform . . .

It has often been emphasized that a free society, such as in the U. S. or in the Western World in general, has an advantage over the systems of lesser freedom, such as dictatorships, in that creative effort has a better chance . . . We have . . . one serious counterfactor in the U. S., *the tendency to conform.* Creative thinking is nonconforming. Moreover, conformity shackles creativity. This does not mean that artificial Bohemianism is needed—on the contrary, that is just another system of conforming. What is needed is not only freedom, but the *practicing* of freedom of approach, of experimenting physically as well as with the mind.

This tendency to conform is a culmination of the extrovert approach. "What do you do in a case like this?" "Let me copy it!" This national pastime of copying, which has spread to so many fields, is a serious threat to our otherwise seemingly unlimited creative potential. It has, no doubt, spread so much because it seems comfortable, it is superficially reassuring: The majority can't be wrong, so no one individual is in the wrong. It makes for the appearance of a serene life. But life is a struggle! We must forever strive for a new balance of the various factors. New combinations are to be achieved, new problems are to be solved, not copies. Creative effort is as difficult as life itself.

Let me not be misunderstood. A certain amount of conforming is necessary. There is merit in the extrovert approach as there is in the introvert approach. We can profit from the experiences of others. We live in a society, and our wanting the same things requires some regulation. We need to communicate, which requires forms of conforming.

But let us not make a fetish of conforming; let us not make the error of trying to tackle life through one approach only. All of the approaches man is capable of have their rightful place. Real living means a balance of many factors. The creative process has many facets and phases—all are needed for accomplishment.

Promoted: Dr. Robert B. Mesrobian, M.A.I.C., to professor of polymer chemistry at Polytechnic Institute of Brooklyn, Brooklyn, N. Y. He is consultant to the nuclear engineering division at the Brookhaven National Laboratory, Long Island. He became associate professor at Polytechnic in 1952.

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The Routes to Creative Thinking

Dr. Harold K. Work, F.A.I.C.

Director, Research Division, College of Engineering, New York University, New York 53, N. Y.

(Reprinted from *Research Review,* College of Engineering, New York University, Vol. 4, No. 2.)

THE SCIENTIST has strong grounds for the plea that he is "misunderstood." One moment he is the evil genius whose handiwork threatens to pulverize our planet; the next minute he is a magician who can provide the full answer to any problem.

Either characterization, of course, is a misconception. Yet a surprising number of scientists themselves harbor the latter, romantic, view of the scientist, especially the creative scientist. There is a feeling that intellect, proper training, and environment virtually assure creativity — the force that is the cornerstone of research. Among the elements of creativity that are less tangible, but at least as potent as degrees and equipment, are the homely virtues of imagination, initiative, perseverance, and that imponderable called chance.

Many expressions of art that seem "spontaneous" or the swift fulfillment of a moment's inspiration represent in reality painstaking, persistent work and thought. A score of drafts may lie behind a poem or book, a decade of rejected ideas behind a great symphony, hundreds of torn sketches behind a masterpiece of painting. For his monumental paintings on the ceiling of the Sistine Chapel, Michelangelo labored on a scafford, flat on his back, for many hours at a time over a four-and-a-half-year period.

The same is true of creative achievement—the steady lifetime of fruitful research as well as the startling new discoveries. It leads to the suggestion that creativity in research is composed of two parts: creative thinking and creative doing.

There is reason for believing that creative thinking is more abundant than creative doing. After each creative development one can usually hear of men who duplicated the underlying thought. Some of them can produce well-authenticated records to show, in fact, that their work antedated that of the acknowledged discoverer. Sometimes, their failure to implement their idea was a matter of timing. Thought was too far ahead of any possible practical fulfillment. Leonardo da Vinci's writings bear this out. In other cases the men with ideas simply lacked the "doing" element in creativity.

As a consequence, it is necessary in any research organization to support those scientists who are largely thinkers with some who are predominantly

doers. The skillful balance of these talents will promote scientific accomplishment.

Scientist's Luck

Asked for the basis of his accomplishment, more than one truly creative scientist has answered, frankly and without false modesty, "I was just plain lucky." "Lucky" in this case may simply mean, as Webster says, "by chance or unexpectedly." But it is rather peculiar that the creative scientist seems to have such luck over and over again.

Most of the problems are there for technically trained persons to see. But only some of those with the intellect and education to recognize the problem will seek the answers, and still fewer will persist toward their solution. Creativity — compounded of ability, imagination, resourcefulness, and just plain "drive"—is the bridge between idea and execution, between problem and solution.

Responsibilities

The creative scientist knows no such creature as unmotivated research. While more and more researchers are laboring toward goals assigned to them, some research seeks information that may or may not have ultimate application. If the scientists in this latter group have as their sole motivation an intense curiosity, I would call that the strongest motivation, and as powerful a spur to creativity as the most careful climate for scientific investigation could foster.

It devolves upon the administrators and sponsors of research to seek and recognize the creative in an individual, to discover how environment governs creativity. It is the individual scientist's duty to cultivate those traits that permit the exercise of creative talents in any climate.

New Position: For Dr. Emil Ott, F.A.I.C., who has been appointed director of Central Chemical Research and a vice president of Food Machinery and Chemical Corporation's Chemical Divisions, 161 East 42nd St., New York 17, N. Y. He was formerly director of research of Hercules Powder Co., Wilmington, Del.

Dr. Ott is presently located in the executive offices of the Chemical Divisions in New York, N. Y., pending completion of a multimillion dollar Research Center, near Princeton, N. J. The new Center will concentrate on long-range research projects in organics, polymers, plastics, tracer techniques, high temperature and high pressure processes.

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October Meeting

The 305th meeting of the National Council of THE AMERICAN INSTITUTE OF CHEMISTS was held Oct. 12, 1955, at 6:00 p.m. at The Chemists' Club, New York, N. Y. President R. P. Dinsmore presided. The following officers and councilors were present: J. Bjorksten, R. P. Dinsmore, A. W. Fisher, Jr., L. A. Hall, K. M. Herstein, F. A. Hessel, D. B. Keyes, H. W. Mackinney, J. H. Nair, G. L. Royer, M. Sittenfield, W. J. Sparks, C. L. Thomas, and L. T. Work. L. T. Eby, chairman of the Membership Committee; M. J. Kelley, chairman of the Committee to Prepare a Manual of Council Operations; S. B. McFarlane, chairman of the Employer-Employee Relations Committee, and V. F. Kimball were present.

The Secretary's report was presented, showing that there are now 2825 AIC members. With deep regret, the deaths of Mary L. Alexander, F.A.I.C., on June 27, 1955, and Dean Williams, Life Member, on August 14, 1955, were presented. Miss Alexander's many helpful services to the INSTITUTE were brought to the Council's attention by Mr. Herstein. Dr. Hall was requested to present a resolution in memory of Miss Alexander at the next meeting of the Council.

The Committees for the year were announced. (See THE CHEMIST, October, 1955.)

Dr. Dinsmore presented a letter informing the INSTITUTE that Fellows are eligible for Fellowship in the American Association for the Advancement of Science.

In response to an inquiry, the Council discussed suggestions for local Chapter programs. Sometimes Chapters make the error of trying to get only prominent chemists for speakers, but more informative programs on professional subjects can frequently be secured by having educational leaders, psychologists, or even labor leaders from local areas present their points of view. The Council offered to assist local Chapters, when they are trying to find a particular individual to speak on a special topic. Chapters are encouraged to find an important local project to work on, such as a project to improve science teaching at the high school level. Such a project would require a large number of people to investigate the situation and to make recommendations. In such projects more members can actively assist in getting results. Another important project is to promote the attitude of professionalism among students. Matters connected with local legislation concerning the chemist or his relationship to the public are subjects which deserve attention. A program that can capture the interest of the young chemist in professional affairs is also important. Dr. Thomas referred to an article in a current of *Harvard Business Review* in which scientists are contrasted with physicians, physicists, and others. Dr. Dinsmore stated that the AIC is not interested in numbers alone, but does want the cooperation of persons really interested in promoting the professional attitude. Normally, only a small percentage of chemists and chemical engineers seem to show interest in professional matters. It is important to increase the professional attitude in the Chapters because through these much real accomplishment can be achieved.

Suggestions made by Ralph B. Deemer, F.A.I.C., concerning changes in the procedure of awarding the Gold Medal were discussed. The Council stated that the Gold Medal is awarded for outstanding distinction in the profession; Honorary Membership is given to recognize professional achievements, and the Honor Scrolls of the Chapters are given to recognize outstanding services through the Chapters to the Institute. The Council agreed that nominations from the membership to the Gold Medal Committee are perfectly in order and that these nominations have been requested previously. Every member is free to send suggestions to the Medal Award Committee, to the Committee on Honorary Membership, or to the Chapter Committees which award the Honor Scrolls. Mr. Deemer's suggestion was referred to the Committee on Constitutional Revision for its report on the changes necessary, if the suggestions were adopted.

The place of the 1957 Annual Meeting was decided to be in the Akron-Cleveland area of Ohio.

The following committee appointments have been made for the 1956 Annual Meeting, to be held May 9-11, at the Hotel Statler, Boston, Mass.:

General Chairman, Dr. John T. Blake.
Chairman of Program, John H. Nair with Dr. A. W. Fisher, Jr.
Annual Meeting Treasurer and Reservation Chairman, George B. Walker, Jr.
Publicity and Arrangements, Richard S. Robinson.

The theme for the meeting will be, "The Chemist Looks at Communications."

The selection of the Committee on Gold Medal Award was announced. (See page 443).

Mr. Herstein presented the report of the New York Chapter representative, John Kotrady. The first issue of the *New Yorkemist,* the Chapter's newsletter, was published during the summer and the second in September. At the October 20th Meeting, a Gold Key was presented to each living past chairman of the Chapter. The Accident and Health Insurance Plan is available to New York Chapter members, if 200 sign up by November 20th.

Dr. Fisher stated that the New England Chapter plans two meetings; the second in April when its Honor Scroll and Student Medals are presented.

Dr. Bjorksten reported that the Chicago Chapter is placing its accent on professional matters. Its next meeting will be a discussion on "Women in Chemistry." Its *Newsletter* is published monthly to carry meeting announcements. The Chapter's Honor Scroll was presented in September to Dr. Charles C. Price.

Dr. Mackinney announced that the New Jersey Chapter met in Plainfield on Oct. 26th to consider Chemistry Teaching. A second meeting will be held Dec. first. In the latter part of March a trip will

be arranged to Picatinny Arsenal. In May the Annual Honor Scroll Award meeting will be held.

Dr. Hessel reported the actions of the Board of Directors and presented the Treasurer's report. The Chicago Chapter was congratulated on its excellent handling of the financial affairs of the 1955 Annual Meeting.

Dr. Eby reported the activities of the Membership Committee.

Council Meeting dates were chosen: December 14, 1955, at The Chemists' Club, New York, N. Y.; February 8, 1956, Akron, Ohio, and May 8, 1956, Boston, Mass.

Mr. McFarlane, chairman of the Committee on Employer-Employee Relations, announced that his committee was considering several matters, including that of the ethics involved in recruitment of chemical personnel. He stated that his committee has two co-chairmen, one from the West Coast and one from Chicago, so that matters concerning chemists in all areas of the country may be properly considered.

The following new members were elected:

FELLOWS

Briggs, William D.
Head of Technical Dept., Turco Products Inc., Box 2649 Terminal Annex, Los Angeles 54, Calif.

Burger, David H.
Administrative and Technical Assistant, Organic Chemical Sales, Wyandotte Chemicals Corp., Wyandotte, Mich.

Dechary, Dr. Joseph M.
Chemist, U. S. Dept. of Agr., Southern Regional Research Lab., 2100 Robert E. Lee Blvd., New Orleans 19, La.

Fisher, Dr. Charles H.
Chief, Southern Utilization Res. Branch, Southern Regional Res. Lab., U. S. Dept. of Agr., 2100 Robert E. Lee Blvd., New Orleans 19, La.

Frankel, Sidney A.
Development Chemist, American Cyanamid, Rubber Chemical Dept., Bound Brook, N. J.

Strite, Dr. Gordon H.
Dow Chemical Co., Research Div., Lake Jackson, Texas.

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Senior Scientist, Westinghouse Atomic Power Div., P.O. Box 1468, Pittsburgh, Pa.

D'Adamo, Jr., Dr. Amedeo F.
Senior Research Chemist, Textile Resins Dept., American Cyanamid Co., Bound Brook, New Jersey.

Kaasen, John A.
Air Pollution Control District, 434 S. San Pedro St., Los Angeles 13, Calif.

Stinchfield, Carleton P.
Research and Development, Norton Co., 1 New Bond St., Worcester, Mass.

ASSOCIATES

Lombardino, Joseph G.
Teaching Fellow-Chemistry, Polytechnic Inst. of Brooklyn, 89 Livingston St., Brooklyn 1, New York.

REINSTATED AS FELLOW

Burry, Dr. H. Maxwell
Self-employed. Main Street, Milo, Maine.

Will You Come

Dec. 1, 1955. Pennsylvania Chapter, Penn-Sherwood Hotel, Philadelphia. Presentation of Honor Scroll to Dr. Mary L. Willard.

Dec. 1, 1955. New Jersey Chapter, in cooperation with Rutgers University Chapter of A.C.S. Affiliates. Physics Lecture Room, Rutgers Univ., New Brunswick, N. J. Panel Discussion, "The Facts of Life for Chemists." Modera-

tor: Prof. Mason W. Gross, Provost of Rutgers University. Speakers: Prof. Hubert N. Alyea, Professor of Chemistry, Princeton University; Dr. Mario Scalera, Director of Research, Bound Brook Labs., Research Div., American Cyanamid Co.

Dec. 6, 1955. Western Chapter. Dinner. Rudi's Italian Inn, Los Angeles, Calif. Speaker: Dr. W. Conway Pierce, "Desalting of Sea Water."

Dec. 14, 1955. National Council and Board of Directors of The American Institute of Chemists. The Chemists' Club, 52 E. 41st St., New York, N. Y. Board meeting at 5:30 p.m. Council meeting 6:00 p.m. Dinner.

Jan. 12, 1956. New York Chapter. Presentation of Honorary AIC Membership to Dr. H. B. McClure, F.A.I.C., president of Carbide & Carbon Chemicals Co. Hotel Commodore, New York, N. Y. Toastmaster, Dr. Sidney D. Kirkpatrick. Speaker for the recipient, Lawrence H. Flett. Acceptance address, "Benefitting from Research Results," Dr. H. B. McClure. Dr. R. P. Dinsmore will present the honorary membership. Reception, sponsored by Carbide & Carbon Chemicals Co., 6 p.m. Dinner, 7 p.m. Dress optional. For reservations, Shepherd Stigman, Foster D. Snell, Inc., 29 W. 15th St., New York 11, N. Y. (WA 4-8800).

Jan. 13, 1956. Chicago Chapter. Speaker, Ethelyne Cortelyou, "Homme ou Femme Chimiste. Peut on les distinguer professionellement?" For information: Dr. Harold M. Coleman, Armour Research Foundation, 10 W. 35th St., Chicago 16, Ill.

Feb. 8, 1956. National Council and Board of Directors of The American Institute of Chemists. Meeting scheduled for Akron, Ohio.

Feb. 10, 1956. New York Chapter. Joint meeting with American Chemical Society. Carbide & Carbon Cafeteria, 30 East 42nd St., New York, N. Y.

March 1956. (Date to be announced.) New Jersey Chapter. Plant trip to Picatinny Arsenal.

April 1956. (Date to be announced.) New England Chapter. Dinner. Award of Honor Scroll and Student Medals.

April 26, 1956. New York Chapter. Theme: "So You're Going to be a Chemist." Student Medal Awards.

May 3, 1956. New Jersey Chapter. Presentation of Honor Scroll. Newark, N. J.

May 9-11, 1956. Annual Meeting of The American Institute of Chemists. Hotel Statler, Boston, Mass. Theme, "The Chemist Looks at Communications." Award of 1956 Gold Medal to Raymond Stevens. The New England Chapter will be our host.

June 7, 1956. New York Chapter. Annual Dinner Meeting. Hotel Commodore, New York, N. Y. Honor Scroll Presentation.

May 1957. (Date to be announced.) AIC Annual Meeting. Akron-Cleveland area, Ohio.

Opportunities

Doris Eager, M.A.I.C.

AIC members who are seeking positions may place notices in this column without charge.

Chemists Available

Polymer Chemist. F.A.I.C., Ph.D., ten years supervisory experience in synthesis and application of plastics, synthetic rubber, surface coatings, petrochemicals. Interested in challenging commercial development position making full use of scientific, administrative and business experience. Box 122, THE CHEMIST.

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Transferred: John Kotrady, F.A.I.C., from the New York offices of The Texas Company to the Beacon Research Laboratories of the company at Beacon, N. Y.

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Two Ears of Corn
Two Blades of Grass

By D. H. Killeffer, F.A.I.C. D. Van Nostrand Co., Inc. 1955. 139 *pp.* 6" x 9". $4.00.

Once in a blue moon, a book is published which gives such a true picture of reality, that, like a breath of cool, clean air, it blows away the smog of ignorance, negative thinking, and despair. Such a book is this. The smoky fires of Malthus, set 150 years ago and smouldering since to flare up in visions of a plundered planet, are here effectively quenched. "In Malthus day, agriculture was primitive in the extreme, and none of these chemical forces had begun to affect farm production." Nor had they produced the new methods of food preservation, soilless crops, modern syntheses of drugs, vitamins, and materials, or modern manufacturing, or atomic energy. Our physical world is new-made by scientists, who meet each problem with the scientific method, not by bewailing the scarcity of the familiar: "We must accustom people

to think as chemists do, not of coal, or oil, or farm land as what we need, but rather of heat, energy and nutrition."

The title? It is taken from Dean Swift, "Voyage to Brobdingnag:"

"And he gave it for his opinion, 'that whoever could make two ears of corn, or two blades of grass, to grow upon a spot of ground where only one grew before, would deserve better of mankind, and do more essential service to his country, than the whole race of politicians put together.' "

By all means read this well-illustrated book to see what man can do, when he uses his creative intellect, instead of being a lamb-like pawn to the laws of probability. Every high school and college library should certainly have it. The young need this clear vision to carry out the future achievements of science.

—V. F. K.

The Chemical Pathology of Animal Pigments

R. T. Williams, Editor. University Press, Cambridge, England. 1954. (*Biochemical Society Symposia, No.* 12). 84 *pp.* $2.75.

The subjects covered in this symposium, held at the London School of Hygiene and Tropical Medicine on Feb. 26, 1954, include: Normal and pathological metabolism of porphyrins; patterns of porphyrin excretion; pathology of acute porphyria; the chemical pathology of bile pigments; methaemoglobin and sulphaemoglobin; and the chemical pathology of carotinoids.

The short papers deal with research on the urine and excreta of animals, which will shed light on certain diseases of the human body. Methods of analysis and of treatment for the diseases under discussion are included where possible.

Among the references which follow each paper, nearly all came from British sources. There may be some new material here for the American biochemist.

—Dr. Frederick A. Hessel, F.A.I.C.

Statistics: On the employment of engineers and scientists in Government appear in the September issue of *Mechanical Engineering*, publication of the American Society of Mechanical Engineers, 29 W. 39th St., New York 18, N. Y. The Government was the largest single employer of engineers, accounting for 11 per cent of the 633,000 engineers working in 1953. Previously unpublished statistics for 1954 are included in this article by Henry H. Armsby.

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Chemical Books Abroad

Rudolph Seiden, F.A.I.C.

Franckh'sche Verlagshandlung, Stuttgart —O: *Kosmos Lexikon, Vol. II: L—Z*; 1955 Long awaited, the missing parts of this encyclopedia of the natural sciences have now become available (see THE CHEMIST, January 1953 and March 1954). The complete work (DM 65.—) includes 5,500 illustrations and over 25,000 key words. If one is looking for facts concerning biology, physiology, botany, zoology, mineralogy, geology, astronomy, palaeontology, general chemistry and physics, or for brief biographical data about scientists, he will find concise answers in this most useful reference work.

Georg Thieme Verlag, Stuttgart: *Methoden der organischen Chemie* (*Houben-Weyl*) by E. Mueller; 4th ed., *Vol. III, Part 2: Physikalische Methoden, II* (1078 pp., 507 ill., DM 186.—) gives every indication that this work, when completed, will become invaluable to the organic chemist. (See THE CHEMIST, August 1955). All there is known today about electrical, optical, magnetic, and acoustic methods used in organic-chemical research and laboratory work has been compiled by 22 experts. Some of the chapter headings are: electrophoresis; polarography; refractometry; electron microscopy; absorption; Raman, infrared, and micro-wave spectroscopy; magnetochemical methods; and supersonance. There are 76 pages of indices.

Communications

For AIC Members to Consider: Pan-American Affiliates

To The American Institute of Chemists:

Members of the AIC, who live near the borders, at times meet some interesting young people from the countries which lie to the South of the United States of America. They are usually men, graduated in chemistry from universities in their own countries. They come here nearly always on their own, without aid or subsidy, but with a rather clear notion in their own minds as to what they want to do. An educated guess will put their number at around two-hundred.

A typical one came from Mexico four years ago. Since then, he has acquired a good grasp of English. He has worked in hospital and clinical laboratories, gained licensure under the California Clinical Laboratories Act, worked a full season as control chemist in a winery, one season in a fruit processing plant and still found time for considerable graduate study in horticulture in Oregon Agricultural College. (He comes from a part of Mexico where a good bit of fruit is grown.) It must be born in mind that the scientific worker from the South of us does not tend to stay strictly in one field of activity. His temperament is adjusted to making better music from an instrument with more than one string. Competition in his part of the world is much tougher than it is here. This man is here to get all the training and experience he can within the program he has laid down for himself. When he is done, he will return to his own country. It is a fair bet that as time passes, he will become a highly respectable and competent part of his country, in the progress of industry, commerce, and science.

The true conservative in the AIC, which does have a moiety of such, will readily admit that we North Americans do not do a particularly good job of understanding our colleague of the Western Hemisphere to the South of us. And equally, these other Americans (which they are), don't do too good a job of understanding us. We are too busy with our own affairs and burdens to pay much attention to theirs. And they, as Latins with a good bit of stiff-necked pride and a tendency to formal behavior, fail ordinarily to get very close to the less formal and more brusque "Anglo".

It appears as we examine this problem that the AIC is missing a bet. Every one of us will agree that by ignoring these young people, we are passing up a chance to get to know them, their countries, and their problems and views. And they, too, miss the chance to get to know us, with all our faults, failings and even virtues and merits. We must bear in mind that the AIC alone offers any real chance of such contact in the chemical field.

As an illustration, how many of our readers can tell why it is that every intelligent Latin American views international conferences, and especially those in the Western Hemisphere, with a mixture of shrugging bewilderment and disgust? It is so, and it would be good for us to know why. It would be good if they, too, knew why. The air would be clearer and we might better a sad situation.

We are all reminded of this around the Ides of March (now April) as we pay taxes and read of the fantastic millions of dollars poured out "all over the world" for "information," "cultural exchange" and "aid" of some sort. We tend, in direct proporation to our realism, to feel that all too often such is being done by bright-eyed men given to "doing good" and to campaigning for bigger appropriations for their "bureau" or whatever. Even the most ardent advocate of "one-worldism" will not contend that all of this vast sum of money is spent wisely and well.

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What can we do about this and what will it cost us? The "do-goodism" and squandering will go right on and we will continue to pay for it until some tensile limit is passed. But there is something we can do on our own and it merits thought and action.

These Pan Americans are in high proportion worthy of being brought into a fellowship with us during their stay. They are aliens and will remain so and thus cannot be admitted to membership in the INSTITUTE. But nothing in the world prevents us from creating a new status as a sort of pseudopod. It is that of the "Pan American Affiliate," who comes into our Institute house by a combination of invitation and application. We get to know one another to our mutual advantage. He is bound by the same ethics as we, and if he does not abide by them, his status is subject to *revocation* — as is ours! His dues are purely nominal. We want to make it easy for him to come in. He does not vote and he knows it. His status is an honorary affiliation and he knows it and values it. It runs from year to year and his nominal dues are receipted right down on the back of his "shingle." And when he returns to his own country, the last part of that "shingle" is filled out and he is then an "emeritus affiliate." If he goes home and gets "unethical" it is his problem—not ours. His probability of deviating from strict ethical standards is no worse risk than ours. Actually it is less, as these people are younger and strongly ruled by ideals.

When these men are back in their own countries and their number grows with time, there will come into existence, beyond any doubt, the "XXX Instituto de los Quimicos, S.A." and as time passes, more sisters will join the family. When the potential benefits of this project, on both sides of the fence, are viewed realistically, it is hard indeed to argue against going forward with it.

With one more word, the presentation of the concept is complete. The term "Pan American" was deliberately chosen. The concept and the status is to be strictly limited to citizens of the component countries of the Western Hemisphere. (We are the *American* Institute of Chemists.) If in the future, such should be brought up for people from other parts of the world, let that be faced strictly on merit. Any such project would be completely separate and apart from this one. In other words, "one thing at a time."

—Dr. L. F. Pierce, F.A.I.C.
Los Angeles, Calif.

The Research Chemist

To the Editor:

(Reply to letter entitled, "Invention Cannot Be Hired," which appeared on page 413, THE CHEMIST, November, 1955.)

A research chemist is not a slave because he can quit his job. A slave cannot.

An invention need not be an "act of genius" in order to be patentable. Most of them are not acts of genius.

Edison said, "Inventions are 99 per cent perspiration and 1 per cent inspiration."

A legal definition cannot change a job relationship into a business relationship. Consulting chemists have a business relationship with a company, hence a client or a professional relationship. An employee is an employee whether a janitor, a research chemist, or a president of a corporation.

It is fantastic to learn that some chemists believe that they sell only time to their employer. I have always believed it was produce results or else.

To compare chemists to capital equipment is indeed slavery, since equipment can be bought and sold. But chemists are not bought and sold like equipment. Baseball players are bought and sold as between ball clubs but such is not the case for chemists as between corporations.

A shopright is a legal term relating to inventions made without permission on company time or with company tools. As a compensation to the company for such theft of company time or tools, the company obtains a license of use of the invention in the shop where such use took place.

Patents are personal property just like any tangible merchandise and therefore are saleable (another word for assignable).

If chemists wish to obtain greater benefits from their inventions they should enter into contracts calling for a minimum weekly wage plus a percentage of the profits of the invention.

The creative artists of Hollywood make such contracts calling for $50,000 per pic-

ture plus 20 per cent of the profits of the picture. Research chemists can also make contracts calling for $100 per week plus 20% of all profits made by the patent, or invention should the employer decide not to patent.

—Dr. Frank Makara
New York 7, N. Y.

Something New

"Mobile Laboratory Glassware Washer." 4 pp. Bulletin 9100. Labline, Inc., 3070 W. Grand Ave., Chicago 22, Ill.

"Ultrasonic processing with low-cost, HF rotating generators." Information. Acoustica Associates, Inc., Glenwood Landing, L. I., N. Y.

"New Solid Desiccant Type Dynamic Dehumidifier for Compressed Gasses." Industrol Corp., Roselle Park, N. J.

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Condensates

Ed. F. Degering, F.A.I.C.

Thought is the by-product neither of perfect idleness nor of great activity but is an accidental sprout that appears unexpectedly on the vine of one's daily routine and that can be cultivated if one catches it soon enough and tends it with some kindness and patience.

—*The New Yorker*

The most valuable of all education is the ability to make yourself do the things you have to do when they have to be done, whether you like it or not.

—Huxley

Two opposing laws seem to me now in contest. The one, a law of blood and death, opening out each day new modes of destruction, forces nations to be always ready for battle. The other, a law of peace, work and health, whose only aim is to deliver man from the calamities which beset him. The one seeks violent conquests, the other the relief of mankind. The one places a single life above all victories, the other sacrifices hundreds of thousands of lives to the ambition of a single individual . . . Which of these two laws will prevail, God only knows. But of this we may be sure, that science, in obeying the laws of humanity, will always labor to enlarge the frontiers of life.

—Pasteur

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Catalog No.	Model	Capacity	Size Inches	No. of Ports	Capacity of Each Port	Capacity of Inner Condenser	Price
D-9065X	Super	8 liters	13 x 13	18 + 2*	450 ml.	7.8 liters	$275.00†
D-9066X	Macro	1.2 liters	10 x 8	12 + 2*	100 ml.	2.8 liters	145.00†
D-9067X	Micro	150 cc.	6 x 4	8 + 2*	25 ml.	600 ml.	75.00†

*Extra ports are for connecting unit to vacuum pump line and gauge.
†Price includes stainless steel cover but not trap, gauge or drying flasks.

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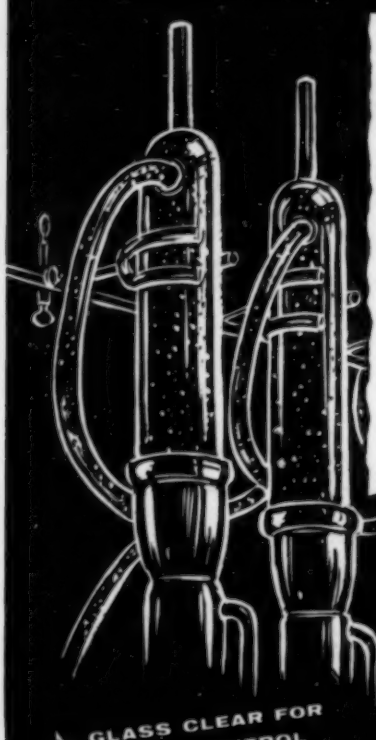

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